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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/875,501 | 06/04/2001 | Klaus Florian Schuegraf | MI22-1741 | 6564 |

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EXAMINER

ORTIZ, EDGARDO

ART UNIT PAPER NUMBER

2815

DATE MAILED: 08/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/875,501

Applicant(s)
Schuegraf Et.al.

Examiner
Edgardo Ortiz

Art Unit
2815



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Jun 21, 2003
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 36 and 42-44 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 36 and 42-44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 21 & 24 6) ☐ Other:

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DETAILED ACTION

This Office Action is in response to a request for continued prosecution filed July 21, 2003.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 36 and 42-44 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over Yang et.al. (U.S. Patent No. 6,040,238) in view of Ilg et.al. (U.S. Patent No. 6,130,145). With regard to Claim 36, a polysilicon layer (16) supported by a substrate (10), a metal silicide layer (18) supported by the polysilicon layer and a silicon-dioxide-containing dopant barrier layer (32) elevationally over the metal-silicide layer and substrate and the barrier layer against only the metal-silicide layer with respect to portions of the substrate laterally outward of the metal-silicide layer, see figure 6.

However, Yang fails to teach that the metal-silicide layer is doped and comprising a Group III dopant or a Group V dopant provided to a concentration of at least about 1×10^{18} ions/cubic cm. Ilg discloses an insitu doped metal polycide which includes a polysilicon layer (230) and a

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metal-silicide layer (240) against the layer of polysilicon, wherein the metal-silicide layer comprises a Group III dopant (B) or a Group V dopant (P, As) and has a concentration of dopants of at least 1×10^{18} ions/cubic centimeter, see column 4, lines 30-46 and column 5, lines 8-24. Therefore, it would have been an obvious modification to someone with ordinary skill in the art, at the time of the invention, to modify the structure as taught by Yang to include a metal-silicide layer with a concentration of dopants of at least 1×10^{18} ions/ cubic cm in a gate structure, as clearly suggested by Ilg, in order to lower the resistance of the metal-silicide layer and increase device performance.

With regard to Claim 42, a further difference between the claimed invention and Yang is, the metal-silicide layer comprising tantalum. Ilg discloses an insitu doped metal polycide which includes a polysilicon layer (230) and a metal-silicide layer (240) against the layer of polysilicon, wherein the metal-silicide layer comprises tantalum, see column 4, lines 32-36. Therefore, it would have been an obvious modification to someone with ordinary skill in the art, at the time of the invention, to modify the structure as taught by Yang to include a metal-silicide layer comprising tantalum, as clearly suggested by Ilg, in order to improve the conductivity of the gate electrode stack of the semiconductor transistor.

With regard to Claim 43, Yang teaches a source/drain region (40) formed in the substrate (10) substantially laterally outward of the conductive line.

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With regard to Claim 44, Yang teaches a field oxide region (12) formed in the substrate (10) laterally spaced from the conductive line, wherein the source/drain regions are formed within a portion of the substrate comprising substantially an entirety of the space between the field oxide region and the conductive line.

Response to Arguments

2. Applicant's arguments with respect to claims 36 and 42-44 have been considered but they are not deemed persuasive for the reasons stated in the body of the office action. Applicant argues, regarding the rejection of claim 36, that *"It is unclear whether the insitu process, the doping or the combination of the two potentially increases the tendency that the silicide will be deposited in its amorphous state. Consequently, in no fair or reasonable interpretation can it be stated that this teaching of Ilg (column 4, lines 30-46) teaches or suggests doping the silicide to lower the resistance as stated by the examiner"*. The examiner disagrees with Applicant's assertion of the teachings of Ilg and notes that one with ordinary skill in the art would recognize that the cited portion is absolutely clear regarding the effect to the metal silicide layer when the layer is doped, more specifically, how the resistance within the layer is lowered. Applicant is also referred to column 5, lines 22-24 of Ilg, which further emphasizes that the effect of adding dopants to the metal silicide results in lower resistance and increased device performance. Regarding the rejection of claims 42-44, Applicant relies on the arguments presented for claim

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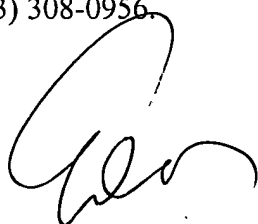
36, and as such, these have been addressed as shown above. Therefore, the claimed invention does not structurally or patentably distinguish over that taught by the prior art.

Conclusion

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Edgardo Ortiz (Art Unit 2815), whose telephone number is (703) 308-6183 or by fax at (703) 308-7724. In case the Examiner can not be reached by a direct telephone call, you might call Supervisor Eddie Lee at (703) 308-1690. Any inquiry of a general nature or relating to the status of this application should be directed to the Group 2800 receptionist whose telephone number is (703) 308-0956.

EO / AU 2815

8/5/03



**EDDIE LEE
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